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ABSTRACT

A three-part evaluation plan is presented for the occupational clusters approach to career orientation project, which attempted to design and field-test a two-semester curriculum package for orienting junior high students to the world of work. Project effectiveness will be estimated at three points in its development. In the laboratory setting evaluation will determine whether deadlines need adjusting, whether curriculum content is accurate, and whether the continually developing material has utility for junior high students. During field-testing evaluation will determine the general perception of all units by teachers, students, and administrators. During the second or third year an experimental design will be utilized to estimate the impact of the course on the behaviors of the students. Comparison of data from experimental and control groups, comparison of growth in both, and differential change among various subsets of students and school environments should be determined. (Steps for evaluating student and staff perceptions, staff development perceptions, and career development effectiveness are outlined including suggested measurement instruments and ideas for analysis of data. (JT)

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EVALUATION DESIGN
for
CLUSTERS APPROACH TO CAREER EDUCATION (CACO)
by

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EVALUATION DESIGN
FOR
Clusters Approach to Career Education (CACO)

A Curriculum Development Project
of
Virginia Polytechnic Institute and State University
by

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INTRODUCTION

The CACO project is an attempt to design and field test a two semester curriculum package for orienting junior high students to the world of work. This career education course proposes to provide students with experiences that will enhance their selection of exploratory and vocational offerings at the secondary school level as well as effect their career development. The basic project activities consist of:

- 1) the development of behavioral descriptions of student expectations,
- 2) the production of student reading materials, activity manuals, teacher's guides, and necessary hardware,
- 3) the field testing and adjustment of the prototype materials, and
- 4) the development and conduct of in-service procedures to assure statewide curriculum implementation.

The effectiveness of the project should be estimated at three points throughout its development.

The laboratory provides the source for the first point of evaluation. In that setting evaluations should determine whether deadlines need adjusting, whether curriculum content is accurate, and whether the continually developing material has utility for junior high students.

The second evaluation point will be at the field test-site when the activities undergo classroom try-out. In that setting evaluation should determine the general perception of all units by teachers, students, and

administrators. Teacher judgments should be made regarding utility of the curriculum. The ability of students to detect the cluster(s) and mode(s) intended for each activity should also be assessed.

The third point for evaluating effectiveness will be during the second or third year when an experimental design can be utilized to estimate the impact of the course on the behaviors of junior high students. Comparison of data from experimental and control groups, comparison of growth in both groups, and differential change among various sub-sets of students and school environments should be determined. Along with this evaluation, an evaluation should be made regarding optimal methods for familiarizing staff with the course materials and their utilization.

Evaluation Segments

In order to provide a suggested plan of operation for the evaluation component of the project, three evaluation segments will be outlined in as much detail as is feasible in this report.

The first segment is an anticipatory segment and describes the nature of base-line data that may have relevance for classifying, summarizing and post-analyzing student, teacher, administrator, parent and community characteristics.

The second segment describes the method and techniques to consider during the laboratory evaluation of the developing curriculum. Quality control at this point will do much to effect reactions during the field-site evaluations.

The third segment, field-site evaluation, provides an opportunity to gain perceptions directly from a sample of users regarding feelings and knowledge gained from the activities. This segment also encompasses a suggested experimental model to use during the third year of the project to determine product effectiveness.

Segment One: Anticipatory

In anticipation of the actual evaluation of project materials and project processes, appropriate base-line data must be gathered in order to make direct comparisons across various populations within the state.

It is important that the data which are used are gathered from similar sources in each of the test sites. Also, it is important that each provider of information has the same understanding of the base-line descriptors. For example, if one classification of students is socio-economic status, one provider of data may list all students from homes with incomes under \$3,000.00 as being from a low socio-economic background. Another provider of data may list all students from homes of under \$5,000.00 as being from low socio-economic backgrounds. The two sets of data would not be comparable. To avoid this problem, guidelines should be provided whenever misinterpretation is possible.

In reviewing the CACO project goals and objectives and in reviewing other projects where base-line data are needed, the following types of information are suggested as possibilities for consideration:

I. School Data

A. School: _____

B. School size:

0 - 300 _____
300 - 600 _____
600 - 1000 _____
over 1000 _____

C. School setting:

Rural/town under 1000 _____
Town 1000 - 5000 _____
Town 5000 - 10,000 _____
Town 10,000 - 25,000 _____
City 25,000 - 100,000 _____
City over 100,000 _____

D. School organization:

K - 6 _____
K - 8 _____
7 - 8 _____
7, 8, 9 _____
Other, specify _____

E. Racial balance:

% Black _____
% White _____
% Other _____

II. Community Data

A. Average family income for school community or smallest geographical unit for which data are available.

Under \$3,000.00 _____
\$3,000 - \$6,000.00 _____
\$6,000 - \$10,000.00 _____
\$10,000 - \$15,000.00 _____
\$15,000 - \$25,000.00 _____
Over \$25,000.00 _____

B. Work force of school community or smallest geographical unit for which data are available:

% Professional, Technical, Manager _____
% Sales & Merchandising _____
% Clerical, Accounting, & Kindred _____
% Farmer, Fishery, & Forestry _____
% Skilled _____
% Semi-Skilled _____
% Service _____
% Unskilled _____
% Unemployed _____

III. Student Data

Student data are to be collected as a part of the field-site evaluation and are referred to in that section.

The South Bend, Indiana, Market Data Report is submitted as an example of the kind of information many communities gather. The particular report is compiled regularly by the local newspaper. Other sources of information of this type would be the Census Bureau, State Employment Service, Chamber of Commerce, local school systems, and various community agencies.

A second report, the Report of the Indiana Public School Dropout - Graduate Prediction Study, is submitted to provide an example of how base-line data can be gathered and analyzed.

Although the initial sampling group has been determined, it is important to reexamine the sample to make certain that it does an adequate job of representing the state school population. One major research effort which utilized a stratified school sampling procedure was that of Project Talent. The career research effort is reported in The Career Data Book: Results from Project Talent's Five Year Follow-up Study. American Institute for Research, Palo Alto, California, 1973.

The sampling procedure utilized in this study is described in detail in Design for a Study of American Youth, Flanagan, Dailey, Shaycroft, Gorham, Orr, and Goldberg, 1962, Chapter 3.

Segment Two: Laboratory

Laboratory evaluation consists of an examination of those elements which can be readily observed both in terms of the process and the materials used in the project.

The first step in the laboratory evaluation is to examine the materials developed for the project. This would include the curriculum activities, teacher's manuals, and any other materials used in conducting the career education course. Materials should be examined for both readability and content validity.

Readability

Printed material may be written in good style and contain a wealth of information, but unless the reader is able to comprehend the material with reasonable understanding, it is of little value. All materials produced for the project should be put to the readability test. One of the most common readability formulas is the one developed by Edgar Dale and Jeanne Chall. Their manual, A Formula for Predicting Readability, is available from the Bureau for Educational Research, Ohio State University. A second reference is the Educational Research Bulletin, 1948, 27, 11-20.

Content Validity

A type of content validity can be established in a project of this nature through a careful examination of materials by a panel of experts who have been trained to identify the critical areas of concern. Such a panel should consist of not less than three individuals who have a working knowledge of the field under study. The following questions would be important for such a panel to ask:

1. Are there materials for all of the activities listed in the project?

It would seem that one of the keys to success of the project would be providing each teacher with as much assistance as possible. Each activity should have prepared materials which provide guidelines for teachers to follow in carrying out the activity. Whenever possible, several alternatives should

be provided in order to give teachers a choice and to show teachers that there is more than one way of reaching the stated goals. Providing alternatives may also encourage teachers to explore still additional ways of accomplishing the stated goals with their specific groups of students.

The task of the panel of experts is to visually examine the materials that relate to each activity and briefly describe what is available. They may use a single scale of inadequate, adequate, and more than adequate to quantify each activity.

2. Do the materials contain what the project says they contain?
This question can be answered by comparing each set of materials with the project description. This response can be quantified on a simple scale of:

materials contain less than is described _____
materials contain what is described _____
materials contain more than what is described _____

3. Does the material cut across all career clusters?
The response to this question can be answered by the panel of experts by visually examining all materials, identifying the cluster or clusters represented by each activity and tabulating their evaluation on a chart listing the 15 USOE Career Clusters. An examination of the chart upon completion of the evaluation task will provide a rating of the number of times each cluster is identified in the project materials.

4. Does the material cut across all work environments?
The panel of experts, with sufficient training to identify the work areas which fall into Holland's six personality types, can quantify the activities. Each panel member will visually examine the materials and tabulate his response to each activity on a chart listing the six work environments. A simple observation of the chart, then, will provide a measure of how well each work environment is covered.

5. Is the material sequenced so that activities build upon each other? Again, the panel, through a visual examination of materials, can make an evaluation of the sequencing. Their evaluation of this aspect of the project can be done on the following scale:

material is in proper sequence _____
material is ahead of sequence _____
material is behind in sequence _____
material stands alone (sequence unimportant) _____

A second kind of evaluation the panel of experts can provide is that of examining the time sequence of the project. Did events occur at the time when they had been planned in the project? Is the project on target? Answers to these questions provide an evaluation of how realistic the planners were in their sequencing of events in the project proposal.

Segment Three: Field-Site

The Cluster Approach to Career Orientation is organized into three phases designed to be utilized throughout an entire school year with junior high students. The three phases are: Introductory, Mode, and Cluster and are prepared so that each contains a series of activities. The activities are designed in a manner that fosters student involvement and thus promotes vicarious learning. As an assist to conducting the course, four different documents are to be developed during the first project year. The perceptions of the contents of these documents by the various user groups should be the nature of the evaluation when field tested in sample classrooms. This evaluation should be conducted in a continuous manner so that material revision may be an on-going process.

The design suggested for the evaluation permits three major types of analyses to be conducted during this Field-Site segment:

- I. perceptions by "users" regarding their feelings and knowledge gained from exposure to the curriculum,
- II. perceptions by educators regarding in-service staff development activities focused on implementing the curriculum, and
- III. evaluation of the effectiveness of the curriculum for enhancing growth in career development constructs.

Suggestions for evaluating each of these categories are presented in this section, and where possible, instrument items are included along with ideas for analysis of the data.

I. User Perceptions (Student and Educator)

A. Student Perceptions

As each activity is completed in the sample classrooms, all students should be asked to provide a judgment about it. The judgment should contain items about the relation of the activity to school subjects, to clusters, to modes, to self-understanding, to career planning, and to student interest and motivation. Certain demographic data should also be included within the instrument to allow post-analysis according to student sex, age, ability, interest and personality. A sample suggested instrument format is shown on the following page.

CAREER ORIENTATION ACTIVITY RATING SCALE

(student)

Directions: In Section I, you are to place a check-mark on one of the seven dashes to show your feeling about the activity. Look at the examples below:

Example 1.

PERSONAL IDENTITY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Good	✓	:	:	:	:	:	:	Bad
Weak	:	✓	:	:	:	:	:	Strong
New	:	:	:	✓	:	:	:	Old

If PERSONAL IDENTITY seemed to mean something very good, you would put a check in position 1 on the Good-Bad line. If PERSONAL IDENTITY also seemed to mean something weak, you would place a check in position 2 on the Weak-Strong line. If PERSONAL IDENTITY also means something not New nor Old, you would place a check in position 4 on the New-Old line.

Example 2.

PERSONAL IDENTITY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Good	:	:	:	:	:	:	✓	Bad
Weak	:	:	:	:	:	:	✓	Strong
New	✓	:	:	:	:	:	:	Old

When you place your check-marks, work rapidly, there are no "right" or "wrong" answers. Remember to make only one check-mark between each pair of words. DO NOT SKIP ANY PAIRS OF WORDS.

Section I

- A. Please write the title and number of the activity you just completed on these lines.

Section I.

B. (Now) rate that activity quickly!

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1. Beautiful	___:	___:	___:	___:	___:	___:	___:	Ugly
2. Useful	___:	___:	___:	___:	___:	___:	___:	Useless
3. Right	___:	___:	___:	___:	___:	___:	___:	Wrong
4. Educated	___:	___:	___:	___:	___:	___:	___:	Ignorant
5. Serious	___:	___:	___:	___:	___:	___:	___:	Humorous
6. Interesting	___:	___:	___:	___:	___:	___:	___:	Dull
7. Long	___:	___:	___:	___:	___:	___:	___:	Short
8. Masculine	___:	___:	___:	___:	___:	___:	___:	Feminine
9. Alive	___:	___:	___:	___:	___:	___:	___:	Dead
10. Easy	___:	___:	___:	___:	___:	___:	___:	Difficult

Section II.

A. This activity seems related to the following school subjects:

(Circle one or more answers.)

1. Arithmetic 2. English 3. Science 4. Social Studies
 5. Fine Arts 6. Vocational Arts 7. Health 8. Others _____

B. Darken each thermometer below to show the degree of each work mode you found in this activity.

VERY MUCH						
MUCH						
LITTLE						
VERY LITTLE						
	CONVENTIONAL	MECHANICAL	CREATIVE	INVESTIGATIVE	SOCIAL	ENTERPRISING

Section II.

B'. Darken the thermometer to show the degree of each work cluster you found in this activity.

- 15 work cluster scale here -

C. This activity helped me to learn more about: (Circle one in each line.)

- | | | | | |
|------------------|-------------|--------|------|-----------|
| 1. Myself: | very little | little | much | very much |
| 2. My schooling: | very little | little | much | very much |
| 3. My career: | very little | little | much | very much |

Section III.

Circle one best answer for each question.

A. Are you a: boy? girl?

B. How old are you now?

1. 12 to 13 2. 14 to 15 3. 16 to 18 4. 19 to 25
5. 26 or older

C. If you had done your best in school, how would you rank among your classmates? (best answer)

1. at the top of the class 2. above the average
3. average 4. somewhat below average

D. Whenever you think of work, you would be happiest if you could do it: (best answer)

1. where others tell you what to do
2. outdoors, using equipment
3. by doing unusual and new things
4. among smart people
5. by helping others
6. where you are the leader

E. Whenever you do something, you want to know: (best answer)

1. what do other people think of me for doing it?
2. "what's in it for me?" and "how long will it last?"

F. Which do you believe? (best answer)

1. making friends is a great goal to have.
2. doing your best is more important than making friends.

Section I provides a semantic differential method of quickly gaining valid perceptions from students. Osgood, Suci and Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois Press, 1957; provides the source for rationale and analysis of this instrumentation. Briefly, the three dimensions of meaning: *evaluation*; *potency*; and *activity* are represented by items 1-6, items 7, 8, and items 9, 10 respectively. By including these items in both the teacher and student questionnaire, it is simple to conceptually compare the learning activity between user groups as well as to identify a summary value attached to the activity by the users.

Section II questions provide a means for relating the activity to the broader objectives of self, education and career relations. It is suggested that questions A and B would be applicable to the teacher also and could provide further comparison data. During the first semester activities, question B would be applicable, but should give way to question B' during the second semester - because of the change in curriculum emphasis.

Section III is provided (for both student and teacher) as a means for gathering post-analysis descriptors of sex, age, ability, interest and personality. The sex and age questions are self descriptive, but allow easy separation of teacher and student data, as well as a means for age and sex separation of responses. The third question (C) elicits ability level data while the fourth question allows respondents to make choices among the Holland (mode/environment) categories. The last two questions are designed to elicit a gross personality structure for classification purposes. A Type I (open/extraverted) person would mark E.1. and F.1. A Type II person (closed/extraverted) would mark E.2 and F.1. A Type III person (closed/intraverted) would mark E.2. and F.2. A Type IV person (open/intraverted) would mark E.2. and F.2 on the two questions. The Scientific Study of Personality by H. J. Eysenck should provide further information regarding this classification. Macmillan published the book in 1952.

For further analysis, a measure of internal consistency could be applied (post hoc) by relating the results of both student and teacher responses for question III.D. to the personality orientation derived in the combination of question III.E. and III.F. responses. (Computer analysis would call this combining operation by the term transformation.)

I. B. Educator Perceptions

In addition to having the teacher complete a COARS when their students complete each activity, it is necessary to receive further information to facilitate activity improvement and quality control. It is suggested this information can be gathered from teachers, administrators, parents (and perhaps a sample of students) through a structured interview during the bi-weekly staff-teacher meetings proposed for the project.

Three types of interview questions should be included so that judgment of quality and usefulness may be made. The following samples may have relevance within each type:

Type 1 - Content Quality

- 1) accuracy 2) appropriateness 3) scope
- 4) organization 5) completeness 6) sequence
- 7) readability

Type 2 - Educational Quality

- 1) use of objectives 2) appropriateness of evaluation questions
- 3) teacher guides 4) student involvement
- 5) pacing 6) time appropriateness

Type 3 - Technical Quality

- 1) editing 2) color 3) durability 4) narration
- 5) visuals 6) special population bias 7) lifelikeness

II. Staff Development Perceptions

The in-service staff development activities are important to evaluate because their repetition will be necessary when the curriculum is implemented throughout Virginia. Or necessity, both the perceptions about the *product* and the *process* with which it is introduced should be evaluated. Again, during the field-testing

period, the results gained through contact with potential "users" will provide ways to effect changes.

Using the three types and samples considered for the structured interview format, questions may be developed that elicit *quality* levels for: student reading materials, teacher guide, activity manual, and hardware package. To simplify the summary of the evaluations, a likert-type rating scale may be devised so that the educator - evaluators can respond by circling or checking a single number on a 1 through 6 scale. (It is suggested an even numbered scale be used so there is no center point for evaluators to apathetically mark.)

A similar scale may be devised to evaluate the *process* for conducting the in-service session. The following points should be considered:

- 1) Did the audience know in advance what the session was to be about?
- 2) Was material available?
- 3) Was the program presented within stated time boundaries?
- 4) Were the physical facilities for the program adequate?
- 5) Were the goals and purposes clearly stated?
- 6) Were learning outcomes specified in performance terms?
- 7) Was there opportunity to review preliminary materials and information?
- 8) Was the cognitive burden of the participants light?
- 9) Did the training format enable active involvement by participants?
- 10) Did the program elicit participant plans for implementing the program in the school?
- 11) Was there opportunity for requesting a follow-up?
- 12) Was there opportunity for participants to share ideas in small groups and summarize for everyone's benefit?

III. Career Development Effectiveness

The second year of field testing with the revised curriculum should have the design of an experimental model. The model should provide for analysis of differences between experimental and control classes, for analysis of beginning to end-of-year growth, and for randomization to control classroom selection bias.

The suggested experimental research design is shown diagrammatically as follows:

<u>Random Classes</u>	<u>1976 Pre test</u>	<u>1976 First Semester</u>	<u>1976 Mid test</u>	<u>1977 Second Semester</u>	<u>1977 Post test</u>	<u>Type</u>
A. (25% of sample)	O ₁	X	O ₂	X	O ₃	experimental
B. (25% of sample)		X		X	O ₄	experimental
C. (25% of sample)	O ₅		O ₆		O ₇	control
D. (25% of sample)					O ₈	control

With the O's denoting the occurrence of testing and the X's denoting classroom use of the proposed CACO activities, the design permits an analysis of differences between experimental and control groups. The 1976 pre-test results (O₁ and O₅) between A and C will help determine if random assignment of classes provided comparable groups at the beginning of the research. Likewise, comparisons between O₂ and O₆ give indications of first semester growth differentials that may be attributed to the activities. Combining O₃ and O₄ and comparing it with the combined O₇ and O₈ results will give differences at the end of the year and provide an evaluation of the significance of the difference effected by CACO.

The design also takes advantage of normal cognitive growth that occurs without advantage of the curriculum activities. Pre tests and post tests are provided on both experimental and control groups to give that comparison. Because some students may be able to learn from the test contents, separate comparisons between O₃ and O₄ and between O₇ and O₈ will allow learning resultive from CACO alone to be determined. The design meets the necessary assumptions required for analysis of the test results by both Analysis of Variance and Analysis of Co-variance Techniques.

As a preparation for this research, the following check (✓) list may be helpful:

Population and sample of classes

- 1) The group from which the samples will be drawn, the procedure for sampling, and willingness of schools to participate is fully known and described. _____
- 2) The basis for arriving at the sample size (number of classrooms) has been considered - see Cohn, Power Analysis. _____
- 3) The method by which classrooms are assigned to groups for the study is known and followed (random table). _____
4. Anticipatory information is requested from the samples during the sampling process. _____

Data Collection and Instrumentation

- 1) Procedures are specifically described regarding the collection of data and giving of tests (where, when, how, etc.). _____
- 2) Instruments are selected that purport to measure the outcomes desired in students as a result of activity effectiveness. _____

The following are suggested instruments for this portion of the evaluation:

CAREER DEVELOPMENT INVENTORY (CDI) by Donald Super, et. al., Teachers College, Columbia University, New York, New York, 10027.

This test is available from the authors and may be used with their permission. It may be locally scored and yields three scale scores related to CACO outcomes. These scores are:

A. Planning Orientation (attitudinal); B. Resources for Exploration (attitudinal); and, C. Information and Decision Making (cognitive). It is appropriate for use at the junior high level and can easily be completed in one class period.

EDUCATION AND OCCUPATIONAL LEVELS (EOL) by Colgate University - GPAS, Office of Educational Research, Hamilton, New York, 13346.

The major function of this instrument is to determine the level of educational and occupational ambition of students. It can be locally scored and results in the following scores:

A. Occupational family and jobs student has interest in; B. Level of occupational ambitions; and, C. Fantasy Level.

CLUSTER INTEREST INVENTORY (CII) by Career Education Systems, P. O. Box 391, Watertown, South Dakota, 57201.

This instrument elicits interest in the fifteen USOE clusters as well as providing a comparison of those interests with interests in sports, hobbies, extra-curricular activities, and school subjects.

Analysis

- 1) The method of analysis to be used to judge growth and make comparisons is known and computer capabilities are prepared. _____

(Suggested analysis would be ANOV or ANCOV).

Time Schedule

- 1) The starting and termination dates are realistic and specific. _____
- 2) The sequence of steps is clear and consistent with competitive programs. _____
- 3) The time schedule is continually communicated to those involved in the experimental sites. _____

The basic schedule on the following page could be used as an evaluation outline during the project.

BASIC SCHEDULE FOR CACO EVALUATION

Type of Information	Schedule for Collection	Instrumentation
Base-line Data & Sampling Procedures	Phase I (1974-75)	Sampling Procedures as described in <u>Design for a Study of American Youth</u>
Readability of printed matter	Phase I (1974-75)	A Formula for Predicting Readability, Dale & Chall
Printed matter content validity	Phase I (1974-75)	Panel of Experts
Student perceptions of activities in CACO.	Initiate during Phase I (1974-75). Fall and spring 1975-76 (Phase II).	Career Orientation Activity Rating Scale. (COARS)
Educator and parent perceptions of activities in CACO.	Initiate during Phase I (1974-75). Fall and spring 1975-76 (Phase II).	COARS (Teachers) Structured Interview
Staff development perceptions of CACO.	Initiate during Phase I (1974-1975). Fall and spring 1975-76 (Phase II).	Material Quality Scale (Likert-Type) In-Service Quality Scale (Likert-Type)
Differential student growth in career development constructs:	Early fall, end of first semester and end of second semester testing in specified sample classes. (Phase III) Fall through Spring 1975-76	Career Development Inventory Education and Occupational Levels Cluster Interest Inventory